DOCUMENT RESUME

ED 186 867 CS 005 450

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TITLE Literacy Requirements in Business and Industry.
INSTITUTION Indiana Univ., Bloomington. School of Education.
SPONS AGENCY National Inst. of Education (DHEW), Washington, D.C.
PUB DATE Jul 79
CONTRACT 400-76-0026
NOTE 63p.
AVAILABLE FROM Reading Research Center, Room 211, School of Education, Indiana University, Bloomington, IN 47401 ($2.50)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Basic Skills; *Business; *Employment Qualifications; Functional Literacy; *Industry; *Job Skills; *Literacy; Literature Reviews; Testing
IDENTIFIERS *Job Literacy

ABSTRACT

This paper is a summary of existing literature on the literacy requirements of various businesses and industries, including the Federal Government. The findings came from a spring 1979 search for literature on the literacy requirements of various businesses and industries during 1969-1979. The report contains information on the following topics: the search pattern (including indices, descriptors, and data retrieval systems), the legal aspects of using literacy measures, research from the Bureau of National Affairs, a review of job screening tests, a review of general literature on job literacy requirements, telephone interviews (information unavailable in the literature review), Civil Service Commission requirements, specific civilian occupations, research on literacy conducted by the military, trends and patterns, and research on educational processes and demands in the workplace. A list of general references is attached. Two appendixes contain an annotated bibliography of business literacy activites and a list of preemployment tests by industry type. (RL)

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LITERACY REQUIREMENTS IN BUSINESS AND INDUSTRY

By

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July 1979

CS005450

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ACKNOWLEDGEMENT

The authors gratefully acknowledge the help of Dorothy Winchester and Brenda Reeder in gathering, compiling, and synthesizing information used in this paper. They appreciate the review and input of Leo Fay and Roger Farr.

This paper was produced pursuant to National Institute of Education contract No. 400-76-0026 for the National Institute for Community Development Incorporated for the National Institute of Education. Any opinions expressed in it do not necessarily express NIE position or policy and no official endorsement by NIE or the U.S. Department of Health, Education and Welfare should be inferred.

PREFACE

This paper, solicited by the National Institute of Education, is a summary of existing literature that describes research on the literacy requirements of various businesses and industries (including the Department of Defense and the Civil Service Commission). The literature search was conducted using both the resources of Indiana University Libraries and selected other materials gathered through direct contact and conversation with representatives from industry and government. A more thorough description of the literature search areas follows in the "Search Pattern" section of this paper.

The paper is organized into the following main sections:

Search Pattern (Listing of Indices, Descriptors, and Data Retrieval Systems Employed)

Legal Aspects of Using Literacy Measures

Bureau of National Affairs Research

Review of Job Screening Tests

Review of General Literature on Job Literacy Requirements

Telephone Interviews (Information unavailable in Literature Review)

Civil Service Commission Requirements

Information on Specific Civilian Occupations

Research in the Military

Trends and Patterns

Research in Process

Conclusions and Recommendations

Bibliographies: General References; Legal Aspects;
Military Research

Appendix A: Annotated Bibliography of Business Literacy Activities

Appendix B: Pre-Employment Tests by Industry Type

SEARCH PATTERN

This paper presents the findings of a search conducted in the Spring 1979 of the literature describing research on the literacy requirements of various businesses and industries during 1969-1979. Information was gathered from a number of different sources, including CIJE (Current Index to Journals in Education), Educational Index, PAIS (Public Affairs Information Service), Occupational Handbooks, Dissertation Abstracts, as well as Business Periodicals Index. An ERIC/PROBE and an ABI-Inform/PROBE were run as a check to the education and business indices already searched, but no additional information was found.

The following descriptors were searched for the period 1969-1979 in Dissertation Abstracts Subjects Index:

Adult	Job Listing
Adult Education	Literacy
Employment Screening	Reading
Industry	Remedial
Job Screening	Workers

The following descriptors were searched in the CIJE ERIC/PROBE for the period 1969-1979:

Employment Qualifications	Adult Basic Education
Job Requirements	Adult Reading Program
Job Qualifications	Adult Literacy
Adults	Apprentices

Apprenticeship Training	Occupational Training
Basic Education	Military
Communication Skills	Military Occupations
Education/Adults	Military Training
Employee Training	Reading
Hardcore Unemployed	Remedial
Illiteracy	Trade Unions/Education
Industry/Industrial Ed.	Training
Labor/Laboring Class-Educ.	Training/Occupation
Literacy	Workers

The following descriptors were searched for the period 1969-1979 in the Business Periodicals Index:

Employee Training	Job Screening
Employment Screening	Job Listing
Employment Requirements	Job Qualifications
Employment Tests	Employee Qualifications
Job Requirements	Illiteracy

The same descriptors were used in a search, for the period 1975-1979, in ABI-Inform, a data bank indexing approximately 200 business and training journals. This search served as a check for the most recent index. Since no additional references were uncovered in this PROBE, it would appear the initial search was thorough.

Lastly, a number of law indices and journals were searched for information

about the legal aspects of literacy testing. Among the sources searched were:

Bureau of National Affairs compilations

Topical Law Reports

U. S. Supreme Court Reports, Lawyers Editions (and Briefs of Counsel for relevant cases)

EEOC Compliance Manuals

Federal Reporters (reports cases heard in U. S. Courts of Appeal)

ALR Quick Index

INTRODUCTION

The thorough review of literature described above revealed a good many articles pertaining to literacy and work. The vast majority of those articles, however, were concerned with literacy activities and training programs in the workplace. An annotated bibliography of such articles is included in Appendix A.

Very little was found relating directly to literacy requirements of various jobs. The information that was unearthed was often limited to a passing reference in an article mainly concerned with training programs. Other information about literacy requirements had to be gathered by inference, i. e. education levels required for employment or difficulty level of screening tests. Such inferences, however, are suspect in the light of jobs with inflated educational requirements and tests of inappropriate reading difficulty.

One significant area of federal legislation seemed to dominate the review

of literature and conversations with industry directors of personnel. Title VII of the Civil Rights Act of 1964 has been subject to a number of executive orders and Supreme Court cases during the 70's. For example, in Uniform Guidelines on Employee Selection Procedures, Sec. 16W, §4010.16, the following guideline is stated:

> Use of employment test having substantial disproportionate impact on minority groups, although related, would be considered arbitrary, unnecessary, and therefore, unlawful if there was a reasonable alternative job selection method of achieving some goal of safe efficient operation of job and alternative had less impact on minority groups than test (From: Topical Law Reports: VI Employment Practices, Chicago: Commerce Clearinghouse, 1976, p. 492).

This order follows potentially conflicting Supreme Court Decisions. In Griggs vs. Duke Power Company--U.S. Supreme Court (1971), 3 FEP Cases 175, the court ruled that tests must be validated as job related, regardless of whether the employer intended to discriminate. Later in Washington vs. Davis--U.S. Supreme Court (1976), 12 FEP Cases 1415, the court held that discriminatory impact and intent are necessary for prosecution.

Much of the literature which appeared after the Griggs vs. Duke Power Company decision was concerned with the inappropriateness of screening tests without really addressing the issue of actual job literacy requirements. At the same time, directors of personnel, aware of the legislation and cautious about litigation, have grown less open about the actual screening procedures used for job placement. Many industries are avoiding published screening tests and are developing internal measures which are "unavailable" to the public.

The major "available" information about job literacy requirements has been research conducted with the armed services. Though not much direct research about civilian jobs is easily available, the authors detect a growing trend in increasing numbers of doctoral dissertations, and word of mouth reports of "studies in progress" funded by grants from various foundations, especially the Ford Foundation and the Spencer Foundation.

LEGAL ASPECTS OF USING LITERACY MEASURES

Since the 1964 Civil Rights Law, a number of government regulations and legal decisions have addressed the issues involved in using ability testing--including literacy testing--for hiring and promotional purposes. The impact of these regulations and rulings has been great in businesses and industries. Because of the multitude of legalities, personnel and training managers have had to learn a great deal more about case law and about job-relatedness (Sharf, 1977). A number of businesses and industries have dropped ability testing programs (Sharf, 1976). Others are reluctant to disclose information about their testing, perhaps because of fear of litigation. (This reluctance was borne out when these researchers called a number of businesses--known to be giving pre-employment screening tests--and were, in most cases, unable to obtain information about the tests.)

The Uniform Guidelines on Employee Selection Procedures (1978) were developed to give governmental agencies and businesses a uniform position in the area of prohibiting employment discrimination (Topical Law Reports, 1976, VI, I). These guidelines, along with the ones outlined in the EEOC Compliance Manual (Bureau of National Affairs, 1978), provide employers with guidance on testing based on the multitude of earlier court decisions. The Uniform Guidelines have been adopted by EEOC, the Civil Service Commission, the Department of Labor, and the Department of Justice. The basic premise of these guidelines is that any testing procedures that have an adverse impact on protected groups are probably unlawful (Uniform Guidelines, 1978, Sec. 6, P 4010.06).

While tests to measure the qualifications of job-seekers are recognized as a valid employment practice under these regulations, tests must be professionally developed, job-related, and not designed, intended or used to discriminate. Thus, literacy tests for hiring or promotion purposes must first be non-discriminatory. In cases where a test is found to have an adverse impact on women or minority groups, the test must either be dropped, or changed in such a way that it eliminates the adverse effect, or subjected to a validity study. If a test is non-discriminatory, validation is not necessary. A validity study is designed to prove that the test is a business necessity and is directly related to the successful performance of a job (Topical Law Reports, 1976, VI, I). The Supreme Court ruled in this regard that "What Congress has commanded is that tests must measure

the person for the job and not the person in the abstract"(Griggs vs. Duke Power Co.). Lastly, if the test is discriminatory and if the test has been shown to validly predict satisfactory job performance, the employer is still obligated to look for an alternative assessment procedure that would result in less discrimination (EEOC Decision, No. 72-0708). Clearly, these guildelines would have an effect on the use of literacy tests and levels for hiring and promotions purposes.

Among the cases and decisions which have direct bearing on literacy testing--and thus on the setting of literacy requirements for jobs--are the following:

Vulcan Society v. Civil Service Commission (references to cases in bibliography): Ruling that the ability to comprehend written materials was not a valid basis for measuring ability to perform as fireman.

EEOC Decision, No. 74-28: Tests which include much technical jargon were probably sex-biased since females, in general, tended to be unfamiliar with such jargon.

Allen v. City of Mobile: A test that measured reading and comprehension, memory, note-taking and verbal skills bore "rational relationship" to the ability to perform police work and thus it was ruled that the test did not require a validation study.

Dickerson v. U. S. Steel: Company validated test by correlating questions with what apprentice should know after completion of training. Court ruled against test.

Davis v. Ameripol, Inc.: Court found there was sufficient relationship to job performance to justify the use of reading and writing tests for oilers and forklift tractor drivers since oilers were required to read labels on oil drums and forklift operators had to read warning signs.

EEOC Decision 72-0691: Ruled that since the General Learning Ability, Verbal Aptitude, Numerical Aptitude, and Clerical sections of the GATB had not been validated for use with minorities, those sections cannot be used.

Boston Chapter, NAACP v. Beecher: Case concerned a test for firefighters consisting of 15 questions covering current events, spelling and vocabulary and 75 questions taken from the firefighters manual. Both sections were ruled illegal since the first set had nothing to do with firefighting and the second set equated memorization of fire fighting terminology with fire fighting ability.

These seven rulings give some indication of the legal complexities of literacy testing; other rulings are included in the bibliography. Employment testing must be examined on an individual basis (Sharf, 1977) since tests which are at all discriminatory must be criterion-related or have predictive validity in order to be legal. Courts have ruled repeatedly (Albermarle Paper Co. v. Moody; Rogers v. International Paper Co.; U.S. v. Jacksonville Terminal Co.; and others) that subjective supervisor or observor performance ratings are not adequate for a validity study. Unless it can be shown to be impossible, objective measures must be used to validate tests. Considering the time involved with constructing and validating tests for each job-level in a business, and considering that each test may be examined on its own merits, it is obvious why some businesses may have abandoned the use of literacy requirements for hiring and promotion, and other are reluctant to reveal such requirements and testing procedures.

BUREAU OF NATIONAL AFFAIRS RESEARCH

The Bureau of National Affairs, Inc. (BNA), a private research organization which sells its research to industries and corporations,

provides salient data relating to the actual extent of testing being conducted. BNA publishes a Policy and Practice Series that interprets laws in virtually every aspect of business, one of which is Personnel Management. (Bureau of National Affairs, 1979). One section is fully devoted to pre-employment testing for hiring and selection. BNA reports on a survey conducted by the Personnel Policies Forum (PPF) in which it was found that psychological tests "defined as measures of skill, ability, intelligence, or personality are given to prospective employees in 42% of the responding companies" (p. 244).

The survey reports that a pre-employment psychological test was usually required for most nonmanagement jobs surveyed by the Personnel Policies Forum Survey. "Most exams are designed to give a job related showing of the applicant's ability to read, write, speak, and/or follow written/oral instructions and perform practical functions" (p. 244). No indication was made of the grade equivalent or reading levels of these exams. BNA does provide a graph which displays the percentage of companies by industry (manufacturing, nonmanufacturing, nonbusiness) and size which give pre-employment psychological tests and for which jobs these tests are given (see Appendix B). Pre-employment psychological tests are used more often in nonmanufacturing industries (62%) than in nonbusiness (38%) or manufacturing (35%) industies and more in large companies (51%) than in smallones (34%). Most tests are given for office/clerical jobs and to a lesser extent in other jobs (production/maintenance,

data processing, sales/service) in all industries.

REVIEW OF JOB SCREENING TESTS

One method of determining the literacy requirements for entry level positions and promotion in various occupations is to examine published tests available to employees and potential employees in various occupations. The Eighth Mental Measurements Yearbook (1978) (MMY) is a volume of reviews of new and revised tests in print since 1972. A number of tests (Careers and Interests, Clerical, Manual Dexterity, Mechanical Ability, Miscellaneous, and Selection and Rating Forms) of job entry qualifications for unskilled, semi-skilled, and professional occupations are listed under the primary category of "Vocations." Tests for specific occupations reviewed in MMY are listed under the categories of Accounting, Business, Computer Programming, Dentistry, Engineering, Law, Medicine, Miscellaneous, Sales, Skilled, Trades and Supervision. The numbers immediately following the name of each test denote the entry number assigned to that test in MMY.

Most vocational tests in each category are designed to screen prospective applicants for jobs or positions in professional or trade schools. By inference, one might assume that the literacy requirements demanded by each test are concomitant with those of the job or school. Though analysis of test reading difficulty is not a standard feature of all test

reviews, occasional references to reading difficulty and complexity do appear. For example, a reviewer of the Dental Admissions Testing Program (1085) states that "The reading comprehension test is composed of a conventional set of multiple choice questions based on a single lengthy passage typical of a dental school text." The Optometry College Admission Test (1104) measures reading ability in the following ways: "The first subtest, verbal ability, is a 20-minute test of vocabulary strength which measures knowledge of synonyms and antonyms of nonscientific words . . . . The ability to read, organize, analyze, and remember new scientific material is assessed in a novel study-reading subtest." At least one test does not require such reading abilities. The Social and Prevocational Information Battery (984) identifies "principal deficits in adaption" to prepare educable mentally retarded youth for employment. The only reading required by this oral exam is the ability to read safety or traffic signs and advertisements.

The test reviews in the Mental Measurements Yearbook provide disappointingly little data regarding the reading levels required by the tests. The majority of tests are developed for high school students and adults except for the Careers and Interest tests which range from elementary grades through adulthood. Attention is given to reading level in the Career Assessment Inventory (grades 8 and over (993)). No apparent reading formula was applied to the test but the author states that the reading level required by the CAI is "at least eighth grade." Because one reviewer

finds the construction of the Vocational Interest, Experience, and Skill Assessment (1025) so unnecessarily confusing,he states that "the scanning or overview which may be part of good text-reading skill or test-taking skill is a disadvantage here." The World of Work Inventory (1031) is attacked because no norms are given and the authors make a number of statements such as, "if the Numerical is higher than the Verbal, then as in other test results, this appears to indicate a reading problem. No research is reported to support such statements." A review of the SRA Test of Mechanical Concepts (1045) states that the "test has a higher verbal loading than is appropriate for persons seeking blue collar jobs" because an examinee may know how to use a tool yet not know its exact name.

Few tests measure reading ability per se; however, Planning Career Goals (1019) is one which gathers data on student abilities. Reading comprehension is measured by 40 items in a 366-item test. No data is provided of those specific items. Other tests in Accounting, Business, Dentistry, Law, Medicine, and Nursing are administered to college students and adults "for college accreditation of nontraditional study, advanced placement, or assessment of education achievement" (1688). Similar to these is the National Occupation Competency Testing Program (1153; NOCTI),which is a massive program to test for "(a) admission to trade and industrial technical teacher education programs, (b) to provide competency tests for temporary or permanent state certification, and (c) to provide occupational competency tests for advanced standing in collegiate

programs of study leading to a baccalaureate degree" (1732) for 24 separate occupations such as carpentry, plumbing, auto mechanic and so on. NOCTI is comprised of written and performance parts, but no information is given regarding reading levels required to take the test or qualify for the job.

Though not all tests reviewed in the Eighth Mental Measurements Yearbook have been analyzed for readability, the few tests that have been so analyzed seem to conform to a pattern. Reviewers often make note of excessive reading difficulty and even reading confusion. Several "professional" tests appear to be comparable to standard reading tests and intelligence tests in content and format. Some reviewers comment on test reading difficulties which are excessively high compared to the potential reading demands experienced on the blue collar jobs for which subjects are being tested. The most strenuous literacy requirement of many occupations may be the screening test encountered before employment.

REVIEW OF GENERAL LITERATURE ON JOB LITERACY REQUIREMENTS

A review of the literature on the topic of vocational testing confirms and supports the above observations drawn from the Eighth Mental Measurements Yearbook. Articles by Schultz (1975) and by Hunt and Lindley (1977) substantiate the claim that pre-employment tests are often too hard

to read. Applicants must contend with unnecessary and irrelevant reading demands before they can meet and solve the problems of the job. These authors express strong doubt that test reading levels are commensurate with the reading levels demanded in particular jobs. According to Schultz (1975), the reading demands of many tests are frequently disproportionate and inconsistent with reading demands of a particular job. "Written tests (Washington State Tests) for clerical jobs are at the seventh, eighth, and eleventh grade levels. The Personnel Analyst test is at the eleventh grade level. The Management Analyst Exam and the Advanced Supervisors Examination for Licensed Engineers have Fog Indexes of 16 (grade level) and 17 (grade level) respectively. The Correctional Sergeant Test has a Fog Index of 18 (grade level)" (p. 19). Schultz argues for simple language in the tests and recommends the "tenth grade level for most classes that require verbal ability, and fifth or sixth level for classes where formal education is not important. These match the difficulty levels of the material most often read by people who hold such jobs" (p. 20). He further recommends that the reading level of the tests be lower than the educational requirements of the job.

Hunt and Lindley (1977) suggest that one method of assessing test item validity and difficulty is to secure the input of job knowledge experts in test construction. Supervisors and those who actually perform the job would seem most qualified to measure item difficulty, i. e. reading level and content of the test question. Most of the published job screening

tests have not followed such a pattern. Hunt and Lindley report a police promotion test as an exception (p. 418).

Schoenfelt et al. (1976) suggest that another way to establish validity would be to devise a test using job related materials. Reading behavior could then be measured by the actual materials to be used on the job and not by an intelligence test.

The process of screening job applicants has become a more cautious procedure during the latter portion of the '70's, perhaps as a result of federal legislation. Many industries appear to be shunning the published tests and relying on internally developed screening measures. Discussion and analysis of such internal measures does not appear in the test literature since the tests are unavailable to the general public. Many personnel directors appear reluctant to discuss screening procedures.

TELEPHONE INTERVIEWS (Information Unavailable in Literature Review)

In a few instances, however, the authors were able to contact industry personnel representatives willing to discuss screening procedures. A telephone conversation with an employee at the Personnel office at Indiana Bell in Indianapolis (6/6/79) yielded the following information. Reading is not a requirement for hire. The Bell test is given orally and an examinee may read the directions by him/herself while the administrator reads them aloud.

A Management Specialist at the office of Personnel Management for the U.S. Civil Service Commission in Indianapolis (6/12/79) stated that nothing in government literature states that a prospective employee must be able to read or write. However, an illiterate automatically defaults because one must be able to read the qualifying pre-employment exams. [As a point of interest the Management Specialist mentioned that an illiterate man had recently been denied a guard position because he couldn't read or write. However, requirements of the job are to stand guard and to use the telephone.]

CIVIL SERVICE COMMISSION REQUIREMENTS

The qualifications for entry level Federal jobs are stated in terms of educational background and job related experience. The literacy demands of jobs are not stated. Rather, they are implied through the educational level, experience, skills and responsibilities required by each job.

The General Schedule (GS) is a graduating pay scale for workers in professional, administrative, technical and clerical jobs, and for workers such as guards and messengers (U.S. Civil Service Commission: Civil Service Handbook, 1978). Almost half of the Federal workers are paid under the GS scale. The following is a list of those levels and the requirements for entry positions into each pay grade:

GS1 - No experience or education
GS2 - High School diploma with no related experience
GS3 - High School diploma with special skills
GS4 - Graduate of 2-year junior college and technical schools
GS5 - A bachelor's degree, or 3 years of responsible experience or an equivalent combination of education and experience
GS7 - 10 One of the following:
  a. A bachelor's degree plus one year of graduate study; or an LL. B. or J. D. degree from a recognized law school; or 4 years of responsible experience; or an equivalent combination of education and experience
  b. A bachelor's degree, an earned rating of 90 or above plus either a 2. 90 grade point average on a 4. 00 scale in all undergraduate courses, or rank in the upper third of your class, or membership in a national honorary society
GS11 - Master's degree or equivalent education or experience
GS12 - 18 Education and experience beyond GS11, but there are no clear cut indications in the literature

The Federal Government encourages potential applicants to have completed high school since job opportunities are best for those with a high school diploma. For further information on job descriptions and requirements, the reader is referred to the U. S. Civil Service Commission: Civil Service Handbook.

INFORMATION ON SPECIFIC CIVILIAN OCCUPATIONS

There seem to be no documents which indicate reading levels for particular civilian jobs. Information on the literacy requirements of specific occupations is minimal. Most of the information pertains to clerical occupations. The following is a summary of the data found.

In an analysis of the performance of secretaries in job related reading

tasks (Heinemann, 1978), it was found that experience on the job was not a successful predictor of efficiency. Findings indicated that many secretaries could not list events in order of priority, could not distinguish main ideas from details, and had difficulty in correctly replacing words in the cloze procedure. If reading ability is affecting job performance to the degree indicated above, it would seem that some type of basic reading and writing screening would be a minimal first step in determining capability for clerical tasks. Such, apparently, is not the case.

With the current status of the Back to Basics movement, it is perhaps useful to note that the State Department of Education of Ohio has developed a competency based performance program for prospective employees in general clerical and stenographic positions. The Vocational Certificate of Completion indicates that an applicant has satisfactorily completed a planned vocational program and the applicant's specific level of competence (Krazel, 1978). This experimental program bridges the communication between vocational teachers and the expectations of businesses in the area. Unfortunately, there is no mention of reading levels required to obtain a certificate.

Grade levels of job requirements are mentioned in only one article. The training materials for hard core unemployed clerical workers in one study yielded readability levels from grade 5.5 to the end of grade 6 (checked against the Stanford Achievement Test Intermediate II Battery) (Beatty, 1975).

In addition to research studies, there are several occupational handbooks that give indications of the requirements for education and levels of reading and writing skills for specific jobs. These levels, often in the form of summary task statements, seem to be arbitrary with most of the requirements stated in general terms: high school education, G. E. D., college courses. No grade level equivalency is mentioned. Three references are cited in this section:

1) The Occupational Outlook Handbook (U. S. Department of Labor, 1978-1979) contains information based on data received from a variety of sources including business firms, trade associations, labor unions, professional societies, educational institutions, and government agencies.

2) A second book is published by Instructional Materials Lab through Ohio State University, Columbus, Ohio (Hinds, 1973). The handbook summarizes the results of an occupational analysis project conducted from June 1, 1973 to December 30, 1974 to train vocational teachers in the techniques of making a comprehensive occupational analysis. Each occupational analysis done as part of the project includes a statement of the tasks performed in an occupation, with the appropriate items identified for each task. In this analysis, reading and writing were listed as parts of various occupations though reading level is not included.

3) The third handbook, Careers Today (Hawes, et al., 1977), includes, among other features, information about prospects for different careers based essentially on findings of the Bureau of Labor Statistics,

U.S. Department of Labor Descriptions of the individual career areas.

To give some indication of how these three occupational handbooks handle selected occupational demands, three representative trades were chosen: bank teller, bookkeeper, lithographer. These trades were chosen at random and were listed in at least two of the three occupational handbooks. Below are their entry level and promotional requirements as stated in each handbook.

Occupational Outlook Handbook, 1978-1979 ed. U.S. Department of Labor, U.S. Government Printing Office. Bureau of Labor Statistics.

1) Occupation: Bank Teller

Requirements: High school not required but preferred

Promotional Requirements: College or specialized training to advance

2) Occupation: Bookkeeper

Requirements: High school with business math, bookkeeping and principles of accounting, some prefer business courses at a Junior College or business school and experience

Promotional Requirements: College courses completed to become accountants

3) Occupation: Lithographer

Requirements: High school, aptitude tests given to determine if they're suited for the job, four or five year apprenticeship program or two year program in printing technology.

Analysis of Occupations Series, Tom Hinds, Director, Instructional Materials Laboratory, Ohio State University, Columbus, Ohio, 1973.

1) Occupation: Bank Teller

a) Task: Verify amount of deposit

Performance Model: Reading Skills/Concepts: detail/inference

writing penmanship

b) Task: Admit customers to safety deposit box

Performance Model: Reading Skills/Concepts: detail/inference

2) Occupation: Bookkeeper

a) Task: Post subsidiary receivable ledger

Performance Model: Reading Skills/Concepts: comprehension, reports/instruction-written and oral, progress report, written and oral

Writing Penmanship, (legibility), spelling, vocabulary-general and technical (accounting) clarity of expression

b) Task: Credit accounts for Returns and Allowances

Performance Model: Reading Skills/Concepts: Comprehension, process reports/instruction, written and oral, progress report, written and oral

Writing — Penmanship, (legibility), spelling, vocabulary-general and technical (accounting) clarity of expression

3) Occupation: Lithographer

a) Task: Remove and inspect part from Arbor Press

Performance Model: Reading — Skills/Concepts: comprehension, detail/inference, trade terminology, recognize symbols, codes, emblems

b) Task: Clean and lubricate universal gringer

Performance Model: Reading — Skills/Concepts: Comprehension, trade terminology, description of mechanism, definition and instruction

Careers Today (1977) New York: Taplinger Publis ing Co., Hawes, Gene et al.

1) Occupation: Bank Teller

Requirements: High school graduate who has some experience in clerical work. Tellers who begin after having taken some college-level courses in banking, or who elect to take further courses in banking, often obtain the more responsible, higher-paying jobs in the field.

2) Occupation: Bookkeeper

Requirements: High school graduates with some background in

business math, typing, bookkeeping, and use of office machines. Most employers require a high school diploma as a minimum qualification for a job as bookkeeping trainee.

3) Occupation: Lithographic artists

Requirements: In hiring beginners, many employers give preference to graduates of two year programs in printing technology. High school graduates may also enter the field through four or five year apprenticeship programs which emphasize one career area but also familiarize the apprenticeship with the other areas. Aptitude tests are usually given to applicants to these programs.

Such summary task statements provide little information about actual literacy requirements of jobs. There have been efforts, however, to get more precise task statements. Smith (1973) interviewed workers and supervisors in over 25 career fields using a questionnaire designed to identify more precisely the reading demands of jobs. Both types of materials used and specific tasks performed were assessed. This information was collected for demands at job entry and later on the job. An expanded version of Smith's form was used in recent research by Mikulecky and Diehl (1979) with 107 workers in 100 occupations. Even refined summary task statements, however, do not completely describe the entry literacy requirements for jobs.

RESEARCH IN THE MILITARY

Research in the civilian sector, which has been reviewed to this point, has tended to be minimal. It appears that most research being conducted on testing and establishing literacy requirements is done within companies and is not published. Indications of literacy requirements are included in career handbooks, but these indications seem to be without research support.

While little is available in the literature about literacy and civilian jobs, a great deal is available about literacy and the military. Branches of the armed services have been conducting research and development activities in literacy and occupations during the past decade. Much of this research is difficult to obtain; increasingly, however, research from the military has been published in educational and training journals. Additionally, over one hundred studies dealing with some aspects of testing or occupational development have been included in the ERIC system over the past five years.

Research in the military has focused on (1) determining the literacy demands of jobs, (2) determining the relationship between literacy-ability and job-ability, (3) developing reliable and valid testing procedures for matching individuals with jobs, and (4) developing ways of restructuring materials to reduce the literacy demands. Brief descriptions of research in each of these four areas follows.

Determining the Literacy Demands

The development of appropriate readability formulas for job materials has been one of the major research efforts. As part of the Air Force effort, Williams, Siegel and Burkett (1974) reviewed 48 methods of predicting comprehensibility; variables from these methods were then used to develop readability measures which are more accurate. Siegel and Bergman (1974) developed and tested several variables drawn from Guilford's (1967) Structure-of-Intellect Model in measuring readability; Siegel and Burkett (1974) expanded this measure to also include psycholinguistic variables (such as morpheme depth, and transformational complexity). Siegel, Williams and others continued this line of research by developing readability measures using seven structure-of-intellect and seven psycholinguistic variables (Williams, Siegel, Burkett and Groff, 1977; Siegel, Williams, et al. 1976) and by developing a computer application of this method of analyzing text (Siegel, Williams et al., 1977).

HumRRO researched other methods of determining the readability of job materials in the Army. Cayler, Sticht, Fox and Ford (1973) developed a simple formula (FORCAST) for estimating the difficulty of job materials. Caylor et al. found FORCAST highly correlated with several other readability formulas; FORCAST was also found to be more accurate on job materials. This formula was applied to materials in seven jobs. In most cases, the materials were found to be more difficult than the average reading level of Army personnel (estimated at 9.0 to 9.9 RGL); more than

half the material exceeded an 11.0 RGL. Similarly, Biersner (1975) surveyed over 400 Navy manuals and found that all of them had readability scores above the 9.0 level.

Caylor et al. also used Job Reading Task Tests (JRTT) to determine reading levels needed for occupations. The JRTT was compared to standard reading tests and was found to be highly correlated. Based on a criterion that 80% of the workers at a reading level should score 70% on the JRTT, Caylor et al. arrived at necessary literacy levels for Cooks (7.0), Repairmen (8.0) and Supply Clerks (10.0). Similar research comparing reading demands and reading grade levels of personnel was carried out on 56 Navy career ladders by Mockovak (1974a; 1974b).

Additional research, including some done in the Navy (Muller) can be found in Sticht and Zapf's (1976) anthology of military readability research.

In addition to readability research, the armed services have also conducted extensive task analyses of jobs. Descriptions of jobs often indicate literacy requirements in terms of summary task statements. For example, in Work in the Navy (McDermott et al., 1975), a career guidance book covering over 70 enlisted occupations, descriptions of jobs include statements like the following:

Lithographer: ". . . good general learning ability; good spelling and grammar. . . "

Machinery Repairman: ability to do ". . . mathematics . . . blueprint reading . . . "

Quartermaster: ". . . above-average ability to think and to learn . . . able to keep complete, accurate records . . . express self clearly in writing. . . ."

Such descriptions are quite similar to those cited earlier for civilian occupations.

Determining the Relationship Between Job-Ability and Reading-Ability

Much of the military interest in readability of materials stemmed from the belief that reading ability affected job performance. Research indicated that in many cases, reading ability was far below level of difficulty (Caylor et al., cited above; Carver, 1974a, 1974b). Duffy (1975) surveyed the reading skill of a large sample of Navy recruits and found 18% below an 8th grade level; because deficient reading skills could cause major errors in job performance, Duffy stressed the importance of reading programs in recruit training. An additional indication of the problem was reported by Aiken, Duffy and Nugent (1977). Men in 10 Navy technical schools were given reading tests and the results compared to the difficulty of materials used in the schools. In eight schools between 10 and 55 percent of the men were found to be reading two or more grade levels below the level of the materials. However, in some of the schools, there was very little required reading, making a simple comparison between ability and demands suspect.

Because of such research, other researchers have attempted to clarify

the relationship between literacy ability and job performance. Kulp (1974) in a well-controlled study found performance at an assembly task decreased when reading skills were more than two grade levels below the difficulty of the instructions. Apparently, workers could tolerate a discrepancy of up to 2 grade levels (cited in Sacher and Duffy, 1978).

Duffy, Aiken and Nugent (1977) found that Navy personnel entering a specialty (with greater reading demands) had considerably higher reading skills than nondesignated personnel. This indicates that the classification process, to some degree, serves to match reading skills and demands. At the same time, significant numbers of personnel in specialites were found to have deficient reading skills.

Sticht, Caylor, Kern and Fox (1971) investigated the job performances of men with varying reading abilities. They found a strong relationship between reading skill and performance when the manual was used voluntarily. This relationship was considerably less for men who did not use the manuals when performing the task, no matter what their level. This would indicate that reading the manual, rather than general ability, was the important factor.

Sacher and Duffy (1978) hypothesized that since reading and general ability were often closely associated, the poorer performance of poor readers may be due to lower general ability and not to lower reading ability. They compared the reading skill of Naval recruits and their performance during the first year in the Navy. Results indicated that reading level was

most predictive of discharge, but only during the academic period of training. They found no evidence that reading ability was a factor in performance after recruit training, indicating that only the academic demands of training interacted with low reading grade levels.

Likewise, Wiley (1972), in attempting to predict job difficulty, found that aptitude was not a good predictor. Time in the service or on the job was the best predictor; aptitude was a low third. The relation between aptitude and job difficulty was nonsignificant over half the time and always small.

Sticht, Caylor, Kern and Fox (1971) and Caylor, Sticht, Fox and Ford (1973) have done extensive work in comparing reading ability to job performance. As summarized in Reading for Working (Sticht, 1975), this work involved comparisons between reading, listening and math skills of workers and various indices of job ability. Sticht et al. used Job Knowledge tests, Job Sample performance tests and supervisor ratings to measure job ability; the first two indices were reported to be related to reading ability (with correlations of between .26 to .57) while supervisor ratings were not related. By using quarter distributions of job knowledge and performance by reading grade level, Sticht et al. identified targeted reading levels for occupations (Armer crewman: 8.0; Supply Specialist: 9.0; Repairman: 8.0 and Cook: 7.0).

Matching Individual With Jobs

Since research cited above indicates that reading ability is partly associated with job performance, measurement of reading levels can provide one source of information for matching individuals with jobs. Much of the work at HumRRO provided some means for doing that. In addition to research cited above, Caylor, Sticht, Fox and Ford (1973) found that scores on the Armed Forces Qualification Test were highly correlated with reading grade levels; a formula was developed for estimating reading ability from the AFQT. This estimation was then correlated with the Army's primary test of job proficiency, the Enlisted Evaluation Test. This thus enabled Caylor et al. to establish minimal reading levels associated with minimally acceptable performance on the EET.

Efforts have also been made in the Air Force to develop simple, standard educational profiles that can be used to match personnel with job requirements (Watson and Goody, 1975). The Armed Services Vocational Aptitude Battery (ASVAB) has been studied in order to match composite scores to specific vocational categories (Jensen and Valentine, 1976). Additionally, increased research in computer application to job placement is being done. Christol and Weismuller (1976) described CODAP (Comprehensive Occupational Data Analysis Programs)--a system of computer routines for analyzing, organizing and reporting occupational information. Task-level descriptions (including literacy tasks) of work performed in a variety of occupations are contained in CODAP.

Some research has also been reported in ways to select test items to predict occupational proficiency in the absence of external criteria (Gould and Christol, 1976). As noted earlier, the lack of external criteria for judging tests has been a major problem for some businesses.

Reducing the Literacy Demands

The Armed Forces, as part of their concern over functional literacy, have been developing ways to reduce the literacy demands of jobs. Efforts in that direction have been reported in the Navy (Sulit and Fuller, 1976), the Air Force (Siegel, Federman and Burkett, 1974; Siegel, Lambert and Burkett, 1974). Sticht (1971) and Kern et al. (1976) gave methods for reducing the literacy demands of jobs. Additionally, much effort is being made to raise the reading ability of military personnel to match the literacy demands (McGoff and Harding, 1974; Sticht, Caylor, Fox, Hauke, Snyder and Kern, 1974)

Annotated Bibliographies

In addition to research cited above, the military also has annotated bibliographies relating to some aspects of literacy and work available through the ERIC system. Among the more relevant are:

Balow, E.M. and Christensen, M.S. Annotated Bibliography of the Air Force Human Resources Laboratory Technical Reports--1968-1975. AFHRL-TR-76-50, AD-A033 772. Brooks AFB, Texas: HQ Air Force Human Resources Laboratory, Oct., 1976. (ED 132 439)

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Waller, E. A. Summary of Research Findings on the Military General Educational Development Program. AFHRL-TR-76-55, AD A-036 109. Lackland AFB, Texas: Personnel Research Division, Dec., 1976.

Ratliff, F. R. and Earles, J. A. Research on the Management, Training, and Utilization of Low-Aptitude Personnel: An Annotated Bibliography. AFHRL-TR-76-69. AD-A042 605. Lackland AFB, Texas: Personnel Research Division, Dec., 1976.

Proceedings of the Annual Conference of the Military Testing Association (18th). Pensacola, Florida: Naval Education and Training Program Development Center, Oct., 1976. (ED 147 344)

Proceedings of the Annual Conference of the Military Testing Association (17th). Fort Benjamin Harrison, IN: U. S. Army Enlisted Evaluation Center, Sept., 1975. (ED 128 402)

TRENDS

The literature on job literacy requirements, especially in civilian occupations, is meager. Recent surveys suggest that paper and pencil testing is still very much in the running as a pre-employment screening technique. However, the literature suggests that there is a push toward more job specific testing with the use of the actual training manuals or job related materials found in daily work. There appears to be a trend in the private sector toward internally developed screening measures which are generally unavailable for inspection. If this trend continues, as is likely in the face of potential litigation, the meager literature on occupational literacy requirements may grow even more meager.

RESEARCH IN PROCESS

One promising development is the growing tendency for the educational community to begin researching educational processes and demands in the workplace. Time limitations prevented the authors from obtaining copies of a number of promising doctoral dissertations listed in Dissertation Abstracts:*

Benedict, C. L. An Analysis of Reading Ability and Its Relationship to Selected Student Variables in Industrial and Technical Education.

Christensen, S. H. Initial Job Entry Competencies in 4 Agriculture Business Clusters for Wyoming H. S. Vocational Agriculture Departments.

Dieterick, L. R. Competency Patterns in Selected Distributive/Marketing Jobs in Florida's Tourism-Related Industries as a Basis for Educational Planning.

Dille, J. L. The Identification of Verbal, Handwriting, and Written Composition Skills and the Level of Those Skills Required by Entry-Level Industrial Mechanics.

Heinemann, S. T. The Performance of Secretaries on Job-Related Reading and Writing Tasks.

Henke, Raymond. An Analysis of Predictors of Job Training and Job Performance for a Disadvantaged Population of San Antonio, Texas.

Hohenhaus, William E. Developing and Evaluating a Procedure for Identifying, Sequencing, and Determining an Instructional Environment for Competencies Needed at Various Occupational Levels in the Retail Feed Industry of Minnesota.

Miller, Arther E. A Study to Determine the Fundamental Education and Training Needs of Packaging Personnel for Job Entry Into the Packaging Material and Machinery Manufacturing Industries.

Nabors, Jon H. A Survey and Analysis of Factors Related to Education and Employability.

Peterson, Richard K. Entry Level Skills and Knowledge for Two Technical Occupations as Perceived by Florida Employers and Educators.

Reiff, Rosanna. Entry-Level Job Qualifications and Employee Attitudes in N. Y. C. Word Processing Centers and Implications for Secondary School Business Education Curriculae in the N. Y. Metro. Area.

Sabol, Joseph. Competencies Needed for Employment in the Sheep Production Industry.

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*EEOC Decision No. 72-0691, Dec. 27, 1971. 4 FEP Cases 443.

EEOC Decision No. 71-786, 3 FEP Cases, 262; EEOC Decision No. 71-1504, 3 FEP Cases 668. If test is discriminatory, employer has burden of proof to show (1) that the test is accurate and useful in predicting performance; (2) that no other reasonable selection devices are available.

EEOC Decision No. 71-1529, 3 FEP Cases 952. If test is discriminatory, tester must show that "device is so necessary to the safe and efficient operation of his business as to justify the policy's discriminatory effects."

*EEOC Decision, No. 72-0708. Dec. 27, 1971. Employer needs to use alternative job selective methods that have less impact on minorities if at all possible.

EEOC Decision No. 68-9-327E, June 18, 1969. 1 FEP Cases 910. Test performance must be substantially related to the job. Rejected use of the Bennett-Gelink Test where no evidence showed if scores predicted later performance.

*EEOC Decision 74-28. Sept. 17, 1973.

EEOC Guidelines on Employment Selection Procedures: August 1, 1970; 29 CFR 1607. Unvalidated tests must be discontinued; job-relatedness of tests must be established.

Uniform Guidelines on Employee Selection Procedures, EEOC:

* Sec. 6B ¶4010.06
Sec. 3B ¶4010.03
* Sec. 16W ¶4010.16
Sec. 7 ¶4010.07
Sec. 15A (2)(a) ¶4010.15
Sec. 4C ¶4010.04
Sec. 11 ¶4010.11
Sec 6A ¶4010.11
Sec. 2E ¶4010.06
Sec. 4E ¶4010.04
Sec. 13 ¶4010.13
Sec. 6 ¶4010.06

Annotation of Selected Pertinent Cases

*Albermarle Paper Co. vs. Moody, 45 L. Ed. 2d 301 (1975) (U.S. Supreme Court, 1975; 10 FEP Cases 1181). Employer allegedly had validated testing program. Court ruled there were four fatal weaknesses in validation, namely, (1) tests validated for only some of the jobs it was used for; (2) validation focussed on high level jobs; (3) validation was done with white workers only; (4) in company test scores with job performance, only subjective supervisor ratings were used.

*Allen vs. City of Mobile. 331 F. Supp. 1134 (D.C. Ala., 1971) affirmed 466 F. 2d 122. Ruled that police sergeant's promotional exam bore a rational relationship to job-performance ability, as against black officers' contention that it discriminated because it was loaded with verbal skills, memory, language, reading and comprehensive ability.

Baker vs. Columbus Municipal Separate School District. 4 FEP Cases 921, CA 5, 1972.

*Boston Chapter, NAACP vs. Beecher. 8 FEP Cases, 855 (CA 1, 1974).

Bridgeport Guardians, Inc. vs. Members of Bridgeport Civil Service Commission. 354 F. Supp. 778 (D.C. Conn., 1973). Even if patrolman's exam

designed to be comprehensive, it must demonstrate relationship to job. Employment exams that are discriminatory in effect should meet standards used in psychological testing, namely criterion-related or predictive validity approach.

Brito vs. Zia Co., 478 F. 2d 1200 (C.A.N.M., 1973). Employee performance evaluation test, based on subjective observations and which tended to discriminate against Spanish workers, ruled invalid and discriminatory.

Buckner vs. Goodyear Tire and Rubber Co., 476 F. 2d 1287 (1973). Test used to select applicants for apprentice training program. Court accepted criterion-related validity evidence where training success was the criterion used in validation.

Castro vs. Beecher 4 FEP Cases 37, 51, D.C. Mass., 1971.

Chance vs. Board of Examiners, 458 F2d 1167 (CA2, 1972).

Culp vs. General American Transportation Corp. 8 FEP Cases 461 (D.C. N. Ohio, 1974). Ruled that rating system, which resulted in black foremen being laid off instead of less senior white foreman, was overly subjective and thus inappropriate.

*Davis vs. Ameripol, Inc. 55 F.R.D. 284 (D.C. Tex., 1972).

Davis vs. Washington, 10 FEP Cases 109 (1975). also 352 F. Supp. 187 (Washington, D.C., D.C., 1972). Ruled that a selection device is job-related and constitutionally acceptable where job analysis demonstrates relevance of content and where test has suitable samples of components of job in question.

*Dickerson vs. U.S. Steel, 17 EPD, ¶8528 (D.C. Pr., 1978).

Douglas vs. Hampton. 10 FEP Cases 91 (C.A.D.C., 1975). Employer may validate an employment test only through the criterion related validity method unless it can show that this method is infeasible.

EEOC vs. Detroit Edison Co. 515 F2d 301 (C.A. 6, 1975). Use of test barred until and unless validated.

EEOC vs. Locals 638 and 28, Sheet Metal Workers 401 F. Supp. 467 (D.C. N.Y. 1975). Mere comparison of subject matter of tests with that used in tests of U.S. Employment Service was inadequate validation study.

Fowler vs. Schwarzwalder 351 F. Supp. 721 (D.C. Minn., 1972). If test discriminates, and even if test has been validated, user must still show that no other suitable selection method is available.

*Griggs vs. Duke Power Co., 401 U.S. 436 (1971). 3 FEP Cases 175.

Johnson vs. Goodyear Tire. 7 FEP Cases 627 (CA 5, 1974).

Moody vs. Albermarle Paper Co. 474 F. 2d 134 (C.A.N.C., 1973). Ruled against using two tests for entrance into seven lines of progression where only one test was validated for one line of progression.

Pennsylvania vs. O'Neill, 473 F. 2d 1029 (1973).

*Rogers vs. International Paper Co. 510 F2d 1340 (CA 8 1975); new trial directed 526 F 2d 722, (CA 8 1975). Job analyses used for validation are to be careful quantification of criterion that represent major or critical work behaviors for individual jobs.

U.S. by Clark vs. H.K. Porter Co., 296 F. Supp. 40 (D.C. Ala., 1968). Where skills required for performance of jobs differed from department to department, requirement of an aptitude test for transfer purposes ruled reasonable.

U.S. vs. Georgia Power Co. 474 F. 2d 906 (C.A. Ga., 1973). Employment tests must be evaluated in settings in which they are used.

U.S. vs. N.L. Industries, Inc. 479 F. 2d 354 (C.A. Mo., 8 Cir., 1973). Homemade test of several math problems given to applicants for clerical positions ruled unacceptable.

U.S. vs. South Carolina 15 EPD ¶7920, 445 F. Supp. 1094 (D.C.S.C. 1977). Disproportionate impact of testing devices (teacher exams) on minorities was inadequate for finding constitutional violation where discriminatory intent was lacking.

*Vulcan Society of N.Y.C. Fire Dept. vs. Civil Service Commission. 6 EPD ¶8974, 490 F 2d 387 (CA-2, 1973).

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McDermott, M. N., B. Paramore and W. T. Callahan. Work in the Navy. Silver Springs, Maryland: Operations Research, June, 1975. (ED 113 530).

McGoff, R. M. and F. D. Harding. A Report on Literacy Training Programs in the Armed Forces. Alexandria, VA: Manpower and Personnel Systems Division, April 1974.

Mockovak, W. P. An Investigation and Demonstration of Methodologies for Determining the Reading Skills and Requirements of Air Force Career Ladders. Lowry AFB, Colo.: Technical Training Division, Jan. 1974. a.

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Siegel, A. I., P. J. Federman and J. R. Burkett. Increasing and Evaluating the Readability of Air Force Written Materials. Lowry AFB, Colo., 1974.

Siegel, A.I., J.V. Lambert, J.R. Burkett. Techniques for Making Written Materials More Readable/Comprehensible. Lowry AFB, Colo.: Air Force Human Resources Laboratory, Aug, 1974.

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Sticht, T.G. and I.J. Beck. Development of An Experimental Literacy Assessment Battery. Final Report. Alexandria, VA: HumRRO, June, 1976 (ED 129 900).

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Sulit, R.A. and J.J. Fuller. Navy Technical Manual System (NTMS) Program Summary. Bethesda, Maryland: Naval Ship Research and Development Center, March, 1976.

Watson, W.J. and K. Goody. Matching Job Education Requirements with Candidates' Educational Attainments--A Pilot Methodological Study. Lackland AFB, Texas: Occupational and Manpower Research Division, Dec., 1975 (ed 126 247).

Wiley, L.N. Analysis of the Difficulty of Jobs Performed by First-Year Airmen in 11 Career Fields. Lackland AFB, Texas: Personnel Research Division, July, 1972.

Williams, A.R., A.I. Siegel and J.R. Burkett. Readability of Textual Materials--A Survey of the Literature. Lowry AFB, Colo.: Air Force Human Resources Lab., July 1974.

Williams, A.R., A.I. Siegel, S.R. Burkett and S.D. Graff. Development and Validation of an Equation for Predicting the Comprehensibility of Textual Material. Lowry AFB, Colo.: Technical Training Division, Feb., 1977 (ED 138 973).

APPENDIX A

Annotated Bibliography of Business Literacy Activities

PURPOSE:

This bibliography represents a systematic search of the following sources for the period 1969-1979: Business Periodicals Index, P.A.I.S., Education Index, and an ERIC Probe under the descriptors:

adults	illiteracy
adult basic education	industry/industrial education
adult literacy	labor/laboring class-education
adult reading programs	literacy
apprentices	occupational training
apprenticeship training	reading
basic education	remedial
communication skills	trade unions/education
education/adult	training
employee training	training/occupation
hardcore unemployed	workers

The subject/author/title catalogues were also searched under the following headings:

adult education	manpower training
adult basic education	Manpower Development Training Act
Conference Board	training
literacy	occupational training
illiteracy	reading/adult

The following descriptors were searched for the period 1969-1979 in Dissertation Abstracts Subject Index:

adult	job testing
adult education	literacy
employment screening	reading
industry	remedial
job screening	workers

Aboud, Grace. Hiring and Training the Disadvantaged for Public Employment. Ithaca, N.Y.: School of Industrial/Labor Relations, Cornell University, 1973. Discusses occupations in which growth is projected for the period 1972-82.

A Model For Training the Disadvantaged--TAT at Oak Ridge, Tenn. Manpower Research Monograph No. 29, Department of Labor, 1973. Description of training program at Oak Ridge, Tenn. Remedial or developmental reading was part of the training program. Includes information about trainees, length of program, materials and costs. This program also made use of volunteers for tutoring.

Anderson, Bernard E. The Opportunities Industrialization Centers: A Decade of Community-Based Manpower Services. Philadelphia: Industrial Research Unit, the Wharton School, University of Pennsylvania, 1976. Reviews Philadelphia project which became a model for other O/C affiliates. Feeder component or pre-vocational training involves basic education, vocabulary (reading) and math. Appendix A includes information about location, funding, number of trainees in other O/C projects.

Banta, Trudy. Job Oriented Education Programs for the Disadvantaged #9 PREP Report, HEW, 1972. General discussion of educational programs for the disadvantaged which includes some program description, e.g., 15% students are full-time employees; used 1-2 basic education instructors.

"Blue-Collar Training Gets a White-Collar Look," Business Week. July 31, 1971, pp. 76-77. Identifies proprietorship schools at Grumman, LTV Aerospace, RCA, Control Data Corp., Bell and Howell, Dictaphone, ITT.

Borus, Michael and Charles G. Buntz. "Problems and Issues in the Evaluation of Manpower Programs," Industrial and Labor Relations Review, Vol. 25, January 1972, pp. 234-245. Discusses difficulty of evaluating manpower programs and suggests reasons for absence of comparative studies.

Burt, Samuel M. and Herbert E. Striner. Toward Greater Industry and Government Involvement in Manpower Development. Kalamazoo: The W. E. Upjohn Institute for Employment Research, 1968. Identifies Westinghouse response to government needs and hard-core trainees. Includes reference to MIND, Inc. and Board of Fundamental Education (BFE) as well as a 1964 Department of Labor study of formal in-plant skill training and up-grading programs.

Cape, William H., ed. Hiring the Disadvantaged. Chapel Hill: Institute of Government, University of North Carolina, 1970. Discusses hiring disadvantaged minorities and the benefits or absence of benefits minorities receive as a result of participation in training and education programs.

Clague, Evan and Leo Kramer. Manpower Policies and Programs, A Review, 1935-75. Traces historical development of government involvement and interest in industrial training with considerable attention to basic education component.

Cohn, Jules. "Is Business Meeting the Challenge of Urban Affairs?" Harvard Business Review, Vol. 48, No. 2, March-April 1970, pp. 68-82. Synopsis of information about employment and training programs in 247-Fortune 500 Companies.

Colbert, John and Marcia Hohn. Guide to Manpower Training. New York: Behavioral Publications, Inc. 1971. Discussion includes reference to and description of reading program at South Boston Skill Center.

Doeringer, Peter B., ed. Programs to Employ the Disadvantaged. Englewood Cliffs, N. J.: Prentice-Hall, Inc. 1969. (Proceedings of a conference on June 30, 1969 at Harvard.) Good summary information about programs at Western Electric, Westinghouse Occupational Training School, Equitable Life etc., as well as extensive references to BFE and MIND, Inc.

Drabant, R. M. "Employing the Unemployable: The Lessons of Experience," Conference Board Record, Vol. 9, Nov. 1972, pp. 12-16. General statement of training needs.

Drotning, John E., David Lipsky, Myron D. Fottler.* "Union Attitudes Toward Significant Aspects of Job Training Programs for the Disadvantaged," Labor Law Journal, Vol. 23, January 1972, pp. 13-24. Good discussion of union employer attitudes toward project JET in Buffalo, New York.

*This is one program which included a basic literacy component and is more thoroughly documented in "Jobs, Education, and Training: Research on a Project Combining Literacy and On the Job Training for the Disadvantaged," Final Report to the Department of Labor, Office of Manpower Research, 1972.

Education, Training and Employment of the Disadvantaged. New York: The Conference Board, 1969. Identifies programs, discusses job training and specifically deals with basic education in Chapter 2. Appendix describes programs considered successful; however, information is up to 1969.

Fine, Sidney A. Guidelines for the Employment of the Culturally Disadvantaged. Kalamazoo, Michigan: W. E. Upjohn Institute for Employment Research, 1969. Discusses what is described as functional skill training in reading and math and identifies programs as well as private companies (MIND, Inc., United States Research and Development, etc.) which provide the training.

Goodman, Paul. "Hiring, Training and Retraining the Hard-Core," Industrial Relations, Vol. 9, No. 1, October 1969. Study of 20 Chicago firms hiring under MDTA--no reference to teaching reading except "There were lots of differences in age and education. So I couldn't . . . lecture. So I tried to work things out on an individual basis. I gave them a workbook of prints and they worked with it." Factors favoring success--materials graded in terms of difficulty, immediate feedback, minimized boredom and fatigue.

Hous, Ida R. Retraining the Work Force. Berkeley: University of California Press, 1967. Provides a sociological framework for training and educational programs of the late sixties and 1970's.

Janger, Allen R. Employing the Disadvantaged: A Company Perspective. New York: The Conference Board 1972. Discussion of NAB programs, background of business involvement.

Janger, Allen R. Employment and Training Program Highlights. Washington: U. S. Department of Labor, Employment and Training Administration, 1978. Provides information about federal assistance for training programs. CETA, WIN, etc.

Janger, Allen R. "Training the Disadvantaged Does Make a Difference," Conference Board Record, Vol. 9, May 1972, pp. 24-28

Janger, Allen R. and Ruth G. Shaeffer. "Managing Programs to Employ the Disadvantaged," Studies in Personnel Policy, #219, New York: The Conference Board, 1970.

Job Opportunity Center: An Evaluative Follow-Up Study. Los Angeles, California: Human Interaction Research Institute, September 1967. Description of one program in Denver and Pueblo, Colorado. Basic skills were part of the program and an evaluation is included. Evaluation seems to indicate poor program.

Job Oriented Education Programs for the Disadvantaged. No. 9, PREP Report, Washington: Health Education and Welfare, 1972. Good Descriptions of Programs--(Chase Manhattan JOBS Program, TAT Union Carbide, Leaf Brands Division, etc.)

Jobs, Education and Training: Research of a Project Combining OJT and Literacy Training for the Disadvantaged, Final Report, April 1972. NTIS PB211181. This document is not presently available for review, but is the final report of Project JET, Buffalo, New York, which combined basic literacy with job training. Unions were somehow involved and employers were also surveyed.

Jobs for the Hard to Employ: New Directions for a Public-Private Partnership. New York: Committee for Economic Development (CED), 1978. Identifies some programs, especially those conducted non-profit organizations, e.g., Opportunities Industrialization Centers of America, Inc. (OIC) and Chicago United. Reference to a companion volume which describes the programs.

Johnson, Louise A. Follow-Up Study of MDTA Economic Development Project Conducted at the Agricultural and Industrial State University at Nashville, 1967. Washington: Bureau of Social Science Research, Inc. See Part III, "Basic Education provided by University's Director of Basic Education." Goal was to raise participants 4 grade levels. By mid-point of program 1-1/2 grades achieved. Some participants advanced 4 grade levels during first 4-1/2 months. One of best documented programs in terms of basic education component.

Kilty, Ted K. "A Study of the Characteristics of Reading Programs in Federal, State, City and County Penal Institutes," Kalamazoo Western Michigan University, 1977.

Kobrak, Peter. Private Assumption of Public Responsibilities: The Role of American Business in Urban Manpower Programs. New York: Praeger, 1973. Historical perspective of federal involvement in training programs as well as the basic education component of MDTA training.

Kokes, Loralyn B. "Reading Program Helps Employees Step Ahead," Journal of Reading, Vol. 20, February 1977, pp. 364-367. Description of remedial reading program in Evanston, Illinois hospital.

Layoff Time Training: A Key to Upgrading Workforce Utilization and EEDC Affirmative Action. Washington: Research and Development Monograph #61, U.S. Department of Labor, 1978. Discussion and description of LOTT Program in California canning industry including reasons for failure of basic education component.

Levitan, Sar A. and Garth L. Mangum. Federal Training and Work Programs in the Sixties. Ann Arbor: University of Michigan Press, 1968. Traces development of programs for training the unemployed and disadvantaged.

Lipsky, David B. "Employer Role in Hard-Core Trainee Success," Industrial Relations, Vol. 12, May 1973, pp. 125-136. Some description and evaluation of Project JET, Buffalo, N.Y.

Lipsky, David, John E. Drotning and Myron D. Fottler. "Some Correlates of Trainee Success in a Coupled OJT Program," Quarterly Review of Economics and Business, Summer 1971.

Lusterman, Seymour. "Education for Work," Conference Board Record, Vol. 13, May 1976, pp. 39-44. General profile of companies which provide training and why.

Lusterman, Seymour. Education in Industry, New York: The Conference Board, June 1977. General discussion of industry involvement in education/training programs. Staffing, organization after-hours, during-hours programs compared in broad statistical terms. Chapter 7, Industry and the Schools, contains information on remedial education. Profiles of 3 companies--Cincinnati Milacron, John Breauner Company and John Hancock Life Insurance Company --included.

Maile, Carlton A., William O. Hancock, and Hal G. Johnson. "Continuing Employee Education in the Fortune 500," Baylor Business Studies, Vol. 9, August/October 1978, pp. 15-17. Little documentation of general statements describing Fortune 500 involvement in training.

Mangum, Garth L. Contributions and Costs of Manpower Development and Training, Washington: Policy Papers in Human Resources and Industrial Relations, 1967. Historical development of MDTA and basic education.

Mangum, Garth L. and John Walsh. A Decade of Manpower Development and Training, Salt Lake City: Olympus Publishing Company, 1973. Some evaluation of MDTA and Skills Center at Newark and Oakland East Bay.

Myers, Charles A. The Role of the Private Sector in Manpower Development Baltimore: Johns Hopkins, 1971. Identification and some description of programs which provide training/education for employees.

Moore, Allen B. "Relating Literacy Development to Career Development." Adult Literacy and Basic Education, Fall, 1977, pp. 190-200. Program models surveyed including names of contact person.

Nadler, Leonard. "Helping the Hard-Core Adjust to the World of Work," Harvard Business Review, Vol. 48, No. 2, March/April 1970, pp. 117-126. Case Studies of five companies which provide special training. Reference to BFE.

Opening the Doors: Job Training Programs. (A Report to the Committee on Administration of Training Programs.) New York: Greenleigh Associates, Inc., 1968. Documents needed for coupled programs, includes tables showing numbers of enrollees and some description of services. However, date is 1968.

Orr, David B., ed. New Directions in Employability. New York: Praeger Publishers, 1973. Chapter 2 is a brief follow-up of Allen Janger "Employing the Disadvantaged," (Conference Board).

Petersen, Gene B. "Basic Education Services in Manpower Training Programs: A Report from the National Inventory of Manpower Programs." This document was not available but may be helpful.

Pucinski, Roman C. and Sharlene Pearlman Hersch. The Courage to Change. New Jersey: Prentice Hall, 1971. Background and development of G. E.'s Woodlaw or Training Center in Cleveland.

Quinn, Robert P., B. D. Fine, and Teresa Levitin. Turnover and Training: A Social Psychological Study of Disadvantaged Workers. Ann Arbor: University of Michigan. Survey Research Center, September 1970. Evaluation of MDTA Program in a large unidentified manufacturing company. Includes evaluation of basic education component, particularly reading.

Roberts, Markley. "Labor Sponsored Pre-Apprenticeship Training: What is the Payoff?" Labor Law Journal, Vol. 21, October 1970, pp. 663-667. Description of Project BUILD in Washington, D.C.

Robison, David. Training and Jobs Programs in Action: Case Studies in Private-Sector Initiative for the Hard-to-Employ. Scarsdale, N.Y.: Work in America Institute, Committee for Economic Development, 1978. Contains current programs and their descriptions, Cummins Engine, etc., as well as breakdown of organizational and funding arrangements.

Roomkin, Myron. An Evaluation of Adult Basi Education Under the Manpower Development and Training Act in Milwaukee. This document was not available, but might be helpful.

Rowan, Richard L. and Herbert R. Northurp. Educating the Employed Disadvantaged for Upgrading: A Report on Remedial Education Programs in the Paper Industry. This document was not available for review.

Ruttenberg, Stanley H. and Associates. Seattle Opportunities Industrialization Center (SOIC) Progress Report 1968. Description of one OIC which operated in Seattle. Includes information about participants, materials and entry reading level of participants. Period covered in report is 1966-1968.

Seay, Donna. "Model Program to Instruct Manpower Training Personnel in Selection and Application of Remedial Instructional Materials to Meet Individual Trainee Needs," Cambridge, Mass: Technical Educational Research Center, Inc., 1974. Abstracted in Manpower Research and Development Projects, U. S. Department of Labor, 1974, p. 74. Description of program to install, implement and evaluate an individualized delivery system of basic and prevocational education.

Strong, Merle E. Developing the Nation's Workforce. Washington, D.C.: American Vocational Association, 1975. Discussion of general training activities of business and industry vis-a-vis blue-collar workers with some more specific description included.

Technical Aids to Manpower Training. Washington: Bureau of National Affairs, 1970. Reports on planning, practices in manpower training programs. Prepared for the Bureau of National Affairs, Manpower Information Service.

Towne, D.C. Interpretive Study of Cooperative Efforts of Private Industry and the Schools to Provide Job-Oriented Education Programs for the Disadvantaged. Not available.

The Development of Human Potential. Tennessee: Oak Ridge Associated Universities, 1970. Description of Training and Technology Program of Union Carbide.

Walther, Regis H. "Study of Effectiveness of Graham Associates Demonstration Project on New Education Programming in Manpower Training Projects," completed 1976. Abstracted in Manpower Research and Development Projects, U. S. Department of Labor, 1976, p. 29. Evaluative research report--results varied, depending upon site. Average student gain was .9 grades in reading during first three months.

Weissman, Harold H., ed. Employment and Educational Services in the Mobilization for Youth Experience. New York: Association Press, 1969. Early remedial education in training programs for young people. Some indications of the problems associated with such programs.

The following dissertations were located in dissertation abstracts:

Dehaven, Gloria. "An Investigation of the Effects of a Training Program on the Work Performance of Disadvantaged Adults," New York University, 1975. Abstract mentions reading comprehension and vocabulary.

Iacabelli, John L. "Training Programs of Private Industry in the Greater Cleveland Area," University of Texas, 1969.

Olsen, Janet Cain. "An Investigation of the Nature, Scope and Organization of Educational Activities Conducted by American Industry," University of Pittsburgh, 1975. Good survey of companies.

Ward, Tom Henry Jr. "An Evaluation of An Industrial Basic Education Program." Chapel Hill, 1976. Evaluation of attitude toward in-plant ABE.

APPENDIX B

Bureau of National Affairs

Pre-Employment Test Survey

Pre-employment Psychological Tests*	% of Companies					
	By Industry			By Size		All Companies
	Mfg.	Nonmfg.	Nonbus.	Large	Small	
a. Given to some prospective employees	35	62	38	51	34	42
b. Given for--						
Office/clerical	30	54	24	43	27	35
Production/ maintenance	10	8	5	11	6	9
Data processing	4	13	0	8	3	6
Sales/service	3	6	0	4	2	3
Other jobs	9	17	16	14	11	13
c. Validity studies of tests have been conducted	17	31	27	28	16	22

*The Bureau of National Affairs, Inc., 1979, p. 245.

Tests Currently in Use*

Employee Group Tested	Name of Test Used
All employees	SRA Verbal 14/
All salaried employees	+Cleaver Self-Description Profile 6/
Office/clerical	+ATS Typing Skills 2/ +ATS Shorthand 2/ +General Clerical Test 11/ +LOMA-Clerical Skills Test 10/ +LOMA-General Knowledge 10/ +LOMA-Math 10/ +Minnesota Clerical Test 11/ +Morgan Spelling Test 1/ O'Rourke Clerical Aptitude Test 12/ +Psychological Corp. Clerical Skills 11/ +Psychological Corp. Typing Skills 11/ Purdue Pegboard 14/ +Science Aptitude Test 11/ Seashore-Bennett Stenographic Proficiency Tests 11/ +Short Employment Tests 11/ SRA Adaptability Test 14/ +SRA Battery of Skills Tests 14/ SRA Checking 14/ +SRA Clerical Battery 14/ SRA Personal Audit 14/ SRA Primary Mental Abilities 14/ SRA Typing Skills 14/ Thurstone Employment Test 8/ Typing Test for Business 11/ +Wonderlic Personnel Test 17/
Production/apprentices Police/fire	+Bennett Mechanical Comprehension 11/ +California Capacity for Apprentices 5/ California Psychological Inventory 13/ +General Aptitude Test Battery 16/ Minnesota Multiphasic Personality Inventory 11/ Minnesota Paper Form Board Test 11/ Ortho-Rater 4/ Otis Lennon Mental Ability Test 14/ Purdue Pegboard 14/ SRA Mechanical Aptitude 14/ SRA Opinion Survey 14/ +SRA Reading and Math 14/ +Survey of Mechanical Insight 5/ Test of "G" Culture Fair 13/ +Wesman Personnel Classification Test 5/ +Wonderlic Personnel Test 17/

Tests Currently in Use (Cont'd)

Employee Group Tested	Name of Test Used
Data processing	Concept Mastery 11/ IBM Adaptability 9/ Ship Destination 15/ SRA Programmer Aptitude 14/
Sales/service	+Activity Vector Analysis 3/ Army General Classification Test 14/
Supervisory Selection	Cleaver Self-Description Profile 6/ +How Supervise 11/ +SRA Adaptability Test 14/ +SRA Nonverbal 14/ SRA Supervisory Index 14/

*The Bureau of National Affairs, Inc., 1979, pp. 246-247.
+Validity studies have been conducted by one or more responding companies.

Test Publishers

1/ Aptitude Associates, 2816 Gallows Road, Vienna, Virginia 22181
2/ Aptitude Test Service Inc., P.O. Box 16, Golf, Illinois 60029
3/ AVA Publications Inc., Clarke Associates, 2 Jackson Walkway, Providence, Rhode Island 02903
4/ Bausch & Lomb, Inc., Rochester, New York 14602
5/ California Test Bureau, CTB/McGraw-Hill, Del Monte Research Park, Monterey, California 93940
6/ J.P. Cleaver, Inc., 29 Emmons Drive, Princeton, New Jersey 08540
7/ Consulting Psychologists Press, Inc., 577 College Avenue, Palo Alto, California 94306
8/ Harcourt Brace Jovanovich, Inc., 757 Third Avenue, New York, New York 10017
9/ IBM, Armonk, New York 10504
10/ Life Office Management Association, 100 Park Avenue, New York, New York 10017
11/ Psychological Corporation, 304 East 45th Street, New York, New York 10017
12/ Psychological Institute, P.O. Box 1117, Lake Alfred, Florida 33850
13/ Psychological Resources, Inc., 1430 West Peachtree Street, N.W., Atlanta, Georgia 30309
14/ Science Research Associates, 259 East Erie Street, Chicago, Illinois 60611
15/ Sheridan Psychological Services, Inc., P.O. Box 837, Beverly Hills, California 90213
16/ U.S. Training & Employment Service, Washington, D.C. 20210
17/ E.F. Wonderlic & Associates, Box 7, Northfield, Illinois 60093